

**WHAT IS CLAIMED IS:**

1. A multi-beam antenna system comprising:  
four pairs of independent transmit and receive  
5 apertures arrange in a square formation such that each pair  
of transmit and receive apertures covers one 90 degree wide  
sector in a manner such that all transmit and receive  
apertures cover a 360 degree range.
- 10 2. A multi-beam antenna system comprising:  
at least one pair of independent transmit and receive  
apertures where each aperture includes:  
a beam former that includes a primary waveguide  
and a plurality of phase shifters; and  
15 at least one secondary waveguide each of which is  
connected to one of the phase shifters and to at least  
one antenna element.

20

25

3. A method for controlling a multi-beam antenna system, said method comprising the steps of:

controlling said multi-beam antenna system to enable transmission of at least one transmit beam and to enable reception of at least one receive beam, wherein said multi-beam antenna system includes:

at least one pair of independent transmit and receive apertures where each aperture includes:

a beam former that includes a primary waveguide and a plurality of phase shifters; and

at least one secondary waveguide each of which is connected to one of the phase shifters and to at least one antenna element.